

## NOTICE OF INTENT

Department of Environmental Quality  
Office of Environmental Assessment  
Environmental Planning Division

Under the authority of the Environmental Quality Act, R.S. 30:2001 et seq., and in accordance with the provisions of the Administrative Procedure Act, R.S. 49:950 et seq., the secretary gives notice that rulemaking procedures have been initiated to amend the Radiation Protection regulations, LAC 33:XV.Chapters 1, 3, 4, 5, 6, 7, 13, and 15 (Log #RP027\*).

This proposed rule is identical to federal regulations found in 62 FR 28948, 5/28/97; 63 FR 37059, 7/9/98; 10 CFR 30.71.Schedule A and B, 34.3, 34.21, 34.23(b), 34.35(a), 34.31(a) and (b)(1), 34.41, 34.47(a)(3), 34.71, and 71.5(b), which are applicable in Louisiana. For more information regarding the federal requirement, contact the Regulation Development Section at (225) 765-0399 or Box 82178, Baton Rouge, LA 70884-2178. No fiscal or economic impact will result from the proposed rule; therefore, the rule will be promulgated in accordance with R.S. 49:953(F)(3) and (4).

This rule package consists of amendments affecting licenses for industrial radiography and radiation safety requirements for industrial radiographic operations. Added language includes procedures for exposure devices containing depleted uranium (DU) shielding, personnel monitoring control language to include electronic personal dosimeters, and new definitions to comply with current federal language. Amendments to various recordkeeping policies include the addition of records at temporary job sites and applicable field stations, the addition of records pertaining to the safety and training of radiographers and radiographer trainees, and changing some recordkeeping requirements from two years to three years. Also included in multiple chapters are additions of safety provisions and minor corrections to citations. To comply with current federal regulations the Appendices in Chapter 3 have been renamed as follows: Appendices A and B will be renamed Schedules A and B, respectively; Appendices C, D, and E will be renamed Appendices A, B, and C, respectively. The overall impact of this rule will be a streamlining of industrial radiographic operations through the addition and modification of various safety and recordkeeping requirements. As a Nuclear Regulatory Commission Agreement State, in accordance with the NRC Agreement signed on May 1, 1967, Louisiana has accepted the responsibility for promulgating regulations that satisfy the compatibility requirement of Section 274 of the Atomic Energy Act of 1954, as amended. In certain areas defined by the NRC, state regulations must be the same as NRC regulations. The extent to which the regulation must be identical, whether in content or in effect, is determined by the NRC. All amendments in this package are consequently mandated by the NRC, to comply with recent NRC regulation changes. The basis and rationale for these amendments are to achieve compatibility with the regulations of the Nuclear Regulatory Commission in accordance with Section 274 of the Atomic Energy Act of 1954, as amended.

This proposed rule meets an exception listed in R.S. 30:2019 (D) (3) and R.S.49:953 (G) (3); therefore, no report regarding environmental/health benefits and social/economic costs is required. This

proposed rule has no known impact on family formation, stability, and autonomy as described in R.S. 49:972.

A public hearing will be held on July 26, 2001, at 1:30 p.m. in the Maynard Ketcham Building, Room 326, 7290 Bluebonnet Boulevard, Baton Rouge, LA 70810. Interested persons are invited to attend and submit oral comments on the proposed amendments. Should individuals with a disability need an accommodation in order to participate, contact Patsy Deaville at the address given below or at (225) 765-0399.

All interested persons are invited to submit written comments on the proposed regulations. Persons commenting should reference this proposed regulation by RP027\*. Such comments must be received no later than July 26, 2001, at 4:30 p.m., and should be sent to Patsy Deaville, Regulation Development Section, Box 82178, Baton Rouge, LA 70884-2178 or to FAX (225) 765-0389. The comment period for this rule ends on the same date as the public hearing. Copies of this proposed regulation can be purchased at the above referenced address. Contact the Regulation Development Section at (225) 765-0399 for pricing information. Check or money order is required in advance for each copy of RP027\*.

This proposed regulation is available for inspection at the following DEQ office locations from 8 a.m. until 4:30 p.m.: 7290 Bluebonnet Boulevard, Fourth Floor, Baton Rouge, LA 70810; 804 Thirty-first Street, Monroe, LA 71203; State Office Building, 1525 Fairfield Avenue, Shreveport, LA 71101; 3519 Patrick Street, Lake Charles, LA 70605; 201 Evans Road, Building 4, Suite 420, New Orleans, LA 70123; 100 Asma Boulevard, Suite 151, Lafayette, LA 70508; 104 Lococo Drive, Raceland, LA 70394 or on the Internet at <http://www.deq.state.la.us/planning/regs/index.htm>.

James H. Brent, Ph.D.  
Assistant Secretary

**Title 33**  
**ENVIRONMENTAL QUALITY**  
**Part XV. Radiation Protection**

**Chapter 1. General Provisions**

**§101. Scope**

\* \* \*

[See Prior Text in A]

B. Attention is directed to the fact that state regulation of source material, by-product material, and special nuclear material in quantities not sufficient to form a critical mass is subject to the provisions of the agreement between the state and the U.S. Nuclear Regulatory Commission and to ~~parts 40 and 150~~ of the U.S. Nuclear Regulatory Commission's regulations (10 CFR parts 40 and 150).

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), repealed and repromulgated by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*

**§116. Public Participation in Licensing Actions**

\* \* \*

[See Prior Text in A-A.2]

3. Determination of Fact-Finding Hearing Necessity. Comments from the public and involved local, parish, and state agencies will be reviewed. Any person, within 20 days of date of publication of the legal notice specified in ~~LAC 33:XV.116.B~~ Subsection A.2 of this Section, may request the administrative authority to call for a fact-finding hearing. The administrative authority will determine the necessity for a fact-finding hearing based on comments received and other available information. The request for the hearing must be in writing and shall contain the following information:

\* \* \*

[See Prior Text in A.3.a-4.c]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), repealed and repromulgated by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2565 (November 2000), LR 27:\*\*



**Title 33**  
**ENVIRONMENTAL QUALITY**  
**Part XV. Radiation Protection**

**Chapter 3. Licensing of Radioactive Material**

**Subchapter A. Exemptions**

**§303. Source Material**

A. Any person is exempt from ~~this Chapter~~ these regulations to the extent that such person receives, possesses, uses, owns, or transfers source material in any chemical mixture, compound, solution, or alloy in which the source material is, by weight, less than 0.05 percent of the mixture, compound, solution, or alloy.

\* \* \*

[See Prior Text in B-D]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), repealed and repromulgated by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*.

**§304. Radioactive Material Other Than Source Material**

A. Exempt Concentrations

1. Except as provided in ~~LAC 33:XV.304~~ Subsection A.2 of this Section, any person is exempt from this Chapter to the extent that such person receives, possesses, uses, transfers, owns, or acquires products or materials containing radioactive material in concentrations not in excess of those listed in ~~Appendix~~ Schedule A of this Chapter.

\* \* \*

[See Prior Text in A.2]

B. Exempt Quantities

1. Except as provided in ~~Subsection LAC 33:XV.304~~ B.3 and 4 of this Section, any person is exempt from these regulations to the extent that such person receives, possesses, uses, transfers, owns, or acquires radioactive material in individual quantities, none of which exceeds the applicable quantity set forth in ~~Appendix~~ Schedule B of this Chapter.

\* \* \*

[See Prior Text in B.2-3]

4. No person may, for purposes of commercial distribution, transfer radioactive material in excess of the individual quantities set forth in ~~Appendix Schedule~~ B of this Chapter knowing, or having reason to believe, that such quantities of radioactive material will be transferred to persons exempt under ~~Subsection LAC 33:XV.304.B~~ of this Section or equivalent regulations of the U.S. Nuclear Regulatory Commission or any other agreement state, except in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission ~~pursuant to~~ in accordance with 10 CFR 32.18 or by the administrative authority ~~pursuant to~~ in accordance with LAC 33:XV.328.B, which license states that the radioactive material may be transferred by the licensee to persons exempt under ~~Subsection LAC 33:XV.304.B~~ of this Section or the equivalent regulations of the U.S. Nuclear Regulatory Commission, or any other agreement state or licensing state. Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing by-product material whose subsequent possession, use, transfer, and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

\* \* \*

[See Prior Text in C-C.1.h]

- i. each source contains no more than one exempt quantity set forth in ~~Appendix Schedule~~ B of this Chapter;
- ii. each instrument contains no more than 10 exempt quantities. For purposes of this requirement, an instrument's source(s) may contain either one or different types of radionuclides, and an individual exempt quantity may be composed of fractional parts of one or more of the exempt quantities in ~~Appendix Schedule~~ B of this Chapter, provided that the sum of such fractions shall not exceed unity; and
- iii. for purposes of this Section, 0.05 microcurie of americium-241 is considered an exempt quantity under ~~Appendix Schedule~~ B of this Chapter.

\* \* \*

[See Prior Text in C.2-5.d]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), repealed and repromulgated by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended LR 24:2091 (November 1998); amended by the Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*.

## **§322. General Licenses: Radioactive Material Other Than Source Material**

\* \* \*

[See Prior Text in A-D.3.h.ii]

i. comply with the provisions of LAC 33:XV.442485 and 443486 for reporting radiation incidents, theft, or loss of licensed material. Such person shall be exempt from the other requirements of Chapters 4 and 10 of these regulations.

\* \* \*

[See Prior Text in D.4-E.1.b]

2. Persons who own, receive, acquire, possess, or use luminous safety devices ~~pursuant to~~ in accordance with the general license in LAC 33:XV.322.E.1 are exempt from the requirements of Chapters 4 and 10 of these regulations, except that they shall comply with the provisions of LAC 33:XV.442485 and 443486.

\* \* \*

[See Prior Text in E.3-I.4]

5. Any person using radioactive material ~~pursuant to~~ in accordance with the general license of ~~LAC 33:XV.322.Subsection I.1 of this Section~~ is exempt from the requirements of Chapters 4 and 10 of these regulations with respect to radioactive material covered by that general license, except that such persons using the mock iodine-125 described in ~~LAC 33:XV.322.Subsection I.1 of this Section~~ shall comply with the provisions of LAC 33:XV.431, 442485, and 443486.

\* \* \*

[See Prior Text in J-J.2.b]

c. are exempt from the requirements of LAC 33:XV.Chapters 4 and 10, except that such persons shall comply with the provisions of LAC 33:XV.431, 442485, and 443486.

\* \* \*

[See Prior Text in J.3-4]

**AUTHORITY NOTE:** Promulgated in accordance with R.S. 30:2001 et seq.

**HISTORICAL NOTE:** Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), repealed and repromulgated by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2567 (November 2000), LR 27:\*\*.

**Subchapter D. Specific Licenses****§324. Filing Application for Specific Licenses**

\* \* \*

[See Prior Text in A - G]

H. Each application to possess radioactive materials in unsealed form, on foils or plated sources, or sealed in glass in excess of the quantities in Appendix EC (Quantities of Radioactive Materials Requiring Consideration of the Need for an Emergency Plan for Responding to a Release) must contain either:

\* \* \*

[See Prior Text in H.1 – I.2]

3. the release fraction in the respirable size range would be lower than the release fraction shown in Appendix EC due to the chemical or physical form of the material;

\* \* \*

[See Prior Text in I.4]

5. facility design or engineered safety features in the facility would cause the release fraction to be lower than shown in Appendix EC;

6. operating restrictions or procedures would prevent a release fraction as large as that shown in Appendix EC; or

\* \* \*

[See Prior Text in I.7 – K.Note<sup>1</sup>]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), repealed and repromulgated by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended LR 20:179 (February 1994), amended by the Office of the Secretary, LR 22:345 (May 1996), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2567 (November 2000), LR 27:\*\*.

**§325. General Requirements for the Issuance of Specific Licenses**

\* \* \*

[See Prior Text in A-C.5.a]

b. persons authorized to possess no more than 1,000 times the quantity specified in ~~Appendix~~ Schedule B of this Chapter or combination of radioactive material listed therein as given in ~~Appendix~~ Schedule B, Note 1, of this Chapter;

\* \* \*

[See Prior Text in C.5.c-D]

1. Each applicant for a specific license authorizing the possession and use of unsealed by-product material of half-life greater than 120 days and in quantities exceeding  $10^5$  times the applicable quantities set forth in ~~Appendix~~ Schedule B of ~~Chapter 4 of these regulations~~ this Chapter shall submit a decommissioning funding plan as described in ~~LAC 33:XV.325~~ Subsection D.5 of this Section. The decommissioning funding plan must also be submitted when a combination of isotopes is involved if  $R$  divided by  $10^5$  is greater than one (unity rule), where  $R$  is defined here as the sum of the ratios of the quantity of each isotope to the applicable value in ~~Appendix C~~ A of this Chapter.

\* \* \*

[See Prior Text in D.2-3.b]

c. Each holder of a specific license issued before the effective date of these regulations and of a type described in Subsection D.2 of this Section shall submit, on or before July 20, 1992, a certification of financial assurance for decommissioning, or a decommissioning funding plan, as described in Subsection D.~~65~~ 65 of this Section, in accordance with the criteria set forth in this Section.

\* \* \*

[See Prior Text in D.3.d]

4. The following table lists required amounts of financial assurance for decommissioning by quantity of material.

a. Greater than  $10^4$  but less than or equal to  $10^5$  times the applicable quantities of ~~Appendix Schedule B of this Chapter 4~~—in unsealed form. (For a combination of isotopes, if R, as defined in ~~LAC 33:XV.325, Subsection D.1 of this Section~~, divided by  $10^4$  is greater than 1 but R divided by  $10^5$  is less than or equal to 1.) \$750,000

b. Greater than  $10^3$  but less than or equal to  $10^4$  times the applicable quantities of ~~Appendix Schedule B of this Chapter 4~~—in unsealed form. (For a combination of isotopes, if R, as defined in ~~LAC 33:XV.325, Subsection D.1 of this Section~~, divided by  $10^3$  is greater than 1 but R divided by  $10^4$  is less than or equal to 1.) \$150,000

c. Greater than  $10^{10}$  times the applicable quantities of ~~Appendix Schedule B of this Chapter 4~~—in sealed Sources or plated foils. (For a combination of isotopes, if R, as defined in ~~LAC 33:XV.325, Subsection D.1 of this Section~~, divided by  $10^{10}$  is greater than 1.) \$75,000

\* \* \*

[See Prior Text in D.5 – 6.a]

b. Financial Assurance Method, Insurance, or Other Guarantee Method. These methods guarantee that decommissioning costs will be paid should the licensee default. A financial assurance method may be in the form of a financial assurance bond, letter of credit, or line of credit. A parent company guarantee of funds for decommissioning costs based on a financial test may be used if the guarantee and test are as contained in ~~Appendix DB~~ of this Chapter. A parent company guarantee may not be used in combination with other financial methods to satisfy the requirements of this Section. Any financial assurance method or insurance used to provide financial assurance for decommissioning must contain the following conditions:

\* \* \*

[See Prior Text in D.6.b.i – 7.d.iv]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), repealed and repromulgated by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended LR 23:1140 (September 1997), amended LR 24:2091 (November 1998), amended by the Office of

Environmental Assessment, Environmental Planning Division, LR 26:1018 (May 2000), LR 26:2568 (November 2000), LR 27:\*\*.

### **§326. Special Requirements for Issuance of Certain Specific Licenses for Radioactive Material**

\* \* \*

[See Prior Text in A-E.1.b]

c. The applicant will have an adequate internal inspection system, or other management control, to ~~assure~~ensure that license provisions, regulations, and the applicant's operating and emergency procedures are followed by radiographers and radiographers' assistants; the inspection system shall include the performance of internal inspections not to exceed three months and the retention of records of such inspections for ~~two~~three consecutive years.

\* \* \*

[See Prior Text in E.1.d]

e. The applicant who desires to conduct his or her own leak tests of sealed sources or exposure devices containing depleted uranium (DU) shielding has established adequate procedures to be followed in ~~leak testing sealed sources~~ for possible leakage and contamination and submits to the Office of Environmental Services, Permits Division a description of such procedures including:

\* \* \*

[See Prior Text in E.1.e-i-f]

g. The applicant submits procedures for verifying and documenting the certification status of radiographers and for ensuring that the certification of individuals as radiographers remains valid.

h. The applicant submits the qualifications of the individual(s) designated as the radiation safety officer (RSO) as described in LAC 33:XV.575.E.

i. The applicant who intends to perform calibrations of survey instruments and/or alarming ratemeters must describe methods to be used and the experience of the person(s) who will perform the calibrations. All calibrations must be performed according to the procedures described and at the intervals prescribed in LAC 33:XV.543 and 577.

j. The applicant identifies and describes the location(s) of all field stations and permanent radiographic installations.

k. The applicant identifies the locations where all records required by these regulations will be maintained.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), repealed and repromulgated by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended LR 24:2092 (November 1998), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2569 (November 2000), LR 27:\*\*.

**§328. Special Requirements for Specific License to Manufacture, Assemble, Repair, or Distribute Commodities, Products, or Devices that Contain Radioactive Material**

\* \* \*

[See Prior Text in A.1.a]

b. the applicant provides reasonable assurance that the concentrations of radioactive material at the time of transfer will not exceed the concentrations in ~~Appendix Schedule A~~ of this Chapter, that reconcentration of the radioactive material in concentrations exceeding those in ~~Appendix Schedule A~~ is not likely, that use of lower concentrations is not feasible, and that the product or material is not likely to be incorporated in any food, beverage, cosmetic, drug, or other commodity or product designed for ingestion or inhalation by, or application to, a human being.

\* \* \*

[See Prior Text in A.2-M.4.g]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), repealed and repromulgated by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended LR 24:2092 (November 1998), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2569 (November 2000), LR 26:2768 (December 2000), LR 27:\*\*.

**§351. Financial Assurance Arrangements**

\* \* \*

[See Prior Text in A – D.2]

3. all others except licensees exempt ~~pursuant to~~ in accordance with LAC 33:XV.Chapter 3, Appendix ~~€A~~; and

\* \* \*

[See Prior Text in D.4 – E]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), repealed and repromulgated by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2573 (November 2000), LR 27:\*\*

<b>Appendix Schedule A</b> <b>Exempt Concentrations</b> (See notes at end of <b>Appendix Schedule A</b> )			
Element (atomic number)	Isotope	Column I Gas Concentration s (mCi/ml) <sup>1</sup>	Column II Liquid and Solid Concentration (mCi/ml) <sup>2</sup>
* * * [See Prior Text in Current Appendix A, Antimony (51) – Erbium (68).Er-171]			
Europium (63)	Eu-152 ( <del>T<sub>r</sub></del> =9.2 h T/2=9.2 hrs)		6 x 10 <sup>-4</sup>
	Eu-155		2 x 10 <sup>-3</sup>
* * * [See Prior Text in Current Appendix A, Fluorine (9)- Beta- and/or gamma-emitting radioactive material not listed above with half-life less than 3 years.]			

#### Footnotes to Schedule A

<sup>1</sup> Values are given only for those materials normally used as gases.

<sup>2</sup> μCi/gm for solids.

Note 1. Many radioisotopes disintegrate into isotopes which are also radioactive. In expressing the concentrations in **Appendix Schedule A**, the activity stated is that of the parent isotope and takes into account the daughters.

Note 2. For purposes of LAC 33:XV.304, where there is involved a combination of isotopes, the limit for the combination should be derived as follows: Determine for each isotope in the product the ratio between the radioactivity concentration present in the product and the exempt radioactivity concentration established in **Appendix Schedule A** for the specific isotope when not in combination. The sum of such ratios may not exceed "1" (i.e., unity).

Example:

$$\frac{\text{Concentration of Isotope A in Product}}{\text{Exempt concentration of Isotope A}} + \frac{\text{Concentration of Isotope B in Product}}{\text{Exempt concentration of Isotope B}} = 1$$

\* \* \*

[See Prior Text in Current Appendix A, Notes 3-4]

<b>Appendix B Exempt Quantities</b>	
<b>Radioactive Material</b>	<b>Microcuries</b>
Antimony 122 (Sb 122)	100
Antimony 124 (Sb 124)	10
Antimony 125 (Sb 125)	10
Arsenic 73 (As 73)	100
Arsenic 74 (As 74)	10
Arsenic 76 (As 76)	10
Arsenic 77 (As 77)	100
Barium 131 (Ba 131)	10
Barium 133 (Ba 133)	10
Barium 140 (Ba 140)	10
Bismuth 210 (Bi 210)	1
Bromine 82 (Br 82)	10
Cadmium 109 (Cd 109)	10
Cadmium 115m (Cd 115m)	10
Cadmium 115 (Cd 115)	100
Calcium 45 (Ca 45)	10
Calcium 47 (Ca 47)	10
Carbon 11 (C 11)	10
Carbon 14 (C 14)	100
Cerium 141 (Ce 141)	100
Cerium 143 (Ce 143)	100
Cerium 144 (Ce 144)	1
Cesium 129 (Cs 129)	100
Cesium 131 (Cs 131)	1,000
Cesium 134m (Cs 134m)	100
Cesium 134 (Cs 134)	1

<b>Appendix B Exempt Quantities</b>	
<b>Radioactive Material</b>	<b>Microcuries</b>
Cesium 135 (Cs 135)	10
Cesium 136 (Cs 136)	10
Cesium 137 (Cs 137)	10
Chlorine 36 (Cl 36)	10
Chlorine 38 (Cl 38)	10
Chromium 51 (Cr 51)	1,000
Cobalt 57 (Co 57)	100
Cobalt 58m (Co 58m)	10
Cobalt 58 (Co 58)	10
Cobalt 60 (Co 60)	1
Copper 64 (Cu 64)	100
Dysprosium 165 (Dy 165)	10
Dysprosium 166 (Dy 166)	100
Erbium 169 (Er 169)	100
Erbium 171 (Er 171)	100
Europium 152 (Eu 152) 9.2h	100
Europium 152 (Eu 152) 13 yr	1
Europium 154 (Eu 154)	1
Europium 155 (Eu 155)	10
Fluorine 18 (F 18)	1,000
Gadolinium 153 (Gd 153)	10
Gadolinium 159 (Gd 159)	100
Gallium 67 (Ga 67)	100
Gallium 72 (Ga 72)	10
Germanium 68 (Ge 68)	10
Germanium 71 (Ge 71)	100
Gold 195 (Au 195)	10
Gold 198 (Au 198)	100
Gold 199 (Au 199)	100
Hafnium 181 (Hf 181)	10
Holmium 166 (Ho 166)	100
Hydrogen 3 (H 3)	1,000
Indium 111 (In 111)	100

<b>Appendix B Exempt Quantities</b>	
<b>Radioactive Material</b>	<b>Microcuries</b>
<del>Indium 113m (In 113m)</del>	100
<del>Indium 114m (In 114m)</del>	10
<del>Indium 115m (In 115m)</del>	100
<del>Indium 115 (In 115)</del>	10
<del>Iodine 123 (I 123)</del>	100
<del>Iodine 125 (I 125)</del>	1
<del>Iodine 126 (I 126)</del>	1
<del>Iodine 129 (I 129)</del>	0.1
<del>Iodine 131 (I 131)</del>	1
<del>Iodine 132 (I 132)</del>	10
<del>Iodine 133 (I 133)</del>	1
<del>Iodine 134 (I 134)</del>	10
<del>Iodine 135 (I 135)</del>	10
<del>Iridium 192 (Ir 192)</del>	10
<del>Iridium 194 (Ir 194)</del>	100
<del>Iron 52 (Fe 52)</del>	10
<del>Iron 55 (Fe 55)</del>	100
<del>Iron 59 (Fe 59)</del>	10
<del>Krypton 85 (Kr 85)</del>	100
<del>Krypton 87 (Kr 87)</del>	10
<del>Lanthanum 140 (La 140)</del>	10
<del>Lutetium 177 (Lu 177)</del>	100
<del>Manganese 52 (Mn 52)</del>	10
<del>Manganese 54 (Mn 54)</del>	10
<del>Manganese 56 (Mn 56)</del>	10
<del>Mercury 197m (Hg 197m)</del>	100
<del>Mercury 197 (Hg 197)</del>	100
<del>Mercury 203 (Hg 203)</del>	10
<del>Molybdenum 99 (Mo 99)</del>	100
<del>Neodymium 147 (Nd 147)</del>	100
<del>Neodymium 149 (Nd 149)</del>	100
<del>Nickel 59 (Ni 59)</del>	100
<del>Nickel 63 (Ni 63)</del>	10
<del>Nickel 65 (Ni 65)</del>	100

<b>Appendix B Exempt Quantities</b>	
<b>Radioactive Material</b>	<b>Microcuries</b>
Niobium-93m (Nb-93m)	10
Niobium-95 (Nb-95)	10
Niobium-97 (Nb-97)	10
Osmium-185 (Os-185)	10
Osmium-191m (Os-191m)	100
Osmium-191 (Os-191)	100
Osmium-193 (Os-193)	100
Palladium-103 (Pd-103)	100
Palladium-109 (Pd-109)	100
Phosphorus (P-32)	10
Platinum-191 (Pt-191)	100
Platinum-193m (Pt-193m)	100
Platinum-193 (Pt-193)	100
Platinum-197m (Pt-197m)	100
Platinum-197 (Pt-197)	100
Polonium-210 (P-210)	0.1
Potassium-42 (K-42)	10
Potassium-43 (K-43)	10
Praseodymium-142 (Pr-142)	100
Praseodymium-143 (Pr-143)	100
Promethium-147 (Pm-147)	10
Promethium-149 (Pm-149)	10
Rhenium-186 (Re-186)	100
Rhenium-188 (Re-188)	100
Rhodium-103m (Rh-103m)	100
Rhodium-105 (Rh-105)	100
Rubidium-81 (Rb-81)	10
Rubidium-86 (Rb-86)	10
Rubidium-87 (Rb-87)	10
Ruthenium-97 (Ru-97)	100
Ruthenium-103 (Ru-103)	10
Ruthenium-105 (Ru-105)	10
Ruthenium-106 (Ru-106)	1
Samarium-151 (Sm-151)	10

<b>Appendix B Exempt Quantities</b>	
<b>Radioactive Material</b>	<b>Microcuries</b>
<del>Samarium 153 (Sm 153)</del>	100
<del>Scandium 46 (Sc 46)</del>	10
<del>Scandium 47 (Sc 47)</del>	100
<del>Scandium 48 (Sc 48)</del>	10
<del>Selenium 75 (Se 75)</del>	10
<del>Silicon 31 (Si 31)</del>	100
<del>Silver 110m (Ag 110m)</del>	1
<del>Silver 111 (Ag 111)</del>	100
<del>Sodium 22 (Na 22)</del>	10
<del>Sodium 24 (Na 24)</del>	10
<del>Strontium 85 (Sr 85)</del>	10
<del>Strontium 89 (Sr 89)</del>	1
<del>Strontium 90 (Sr 90)</del>	0.1
<del>Strontium 91 (Sr 91)</del>	10
<del>Strontium 92 (Sr 92)</del>	10
<del>Sulfur 35 (S 35)</del>	100
<del>Tantalum 182 (Ta 182)</del>	10
<del>Technetium 96 (Tc 96)</del>	10
<del>Technetium 97m (Tc 97m)</del>	100
<del>Technetium 97 (Tc 97)</del>	100
<del>Technetium 99m (Tc 99m)</del>	100
<del>Technetium 99 (Tc 99)</del>	10
<del>Tellurium 125m (Te 125m)</del>	10
<del>Tellurium 127m (Te 127m)</del>	10
<del>Tellurium 127 (Te 127)</del>	100
<del>Tellurium 129m (Te 129m)</del>	10
<del>Tellurium 129 (Te 129)</del>	100
<del>Tellurium 131m (Te 131m)</del>	10
<del>Tellurium 132 (Te 132)</del>	10
<del>Terbium 160 (Tb 160)</del>	10
<del>Thallium 200 (Tl 200)</del>	100
<del>Thallium 201 (Tl 201)</del>	100
<del>Thallium 204 (Tl 204)</del>	10
<del>Thulium 170 (Tm 170)</del>	10

<b>Appendix B Exempt Quantities</b>	
<b>Radioactive Material</b>	<b>Microcuries</b>
Thulium 171 (Tm 171)	10
Tin 113 (Sn 113)	10
Tin 125 (Sn 125)	10
Tungsten 181 (W 181)	10
Tungsten 185 (W 181)	10
Tungsten 187 (W 187)	100
Vanadium 48 (V 48)	10
Xenon 131m (Xe 131m)	1,000
Xenon 133 (Xe 133)	100
Xenon 135 (Xe 135)	100
Ytterbium 175 (Yb 175)	100
Yttrium 87 (Y 87)	10
Yttrium 88 (Y 88)	10
Yttrium 90 (Y 90)	10
Yttrium 91 (Y 91)	10
Yttrium 92 (Y 92)	100
Yttrium 93 (Y 93)	100
Zinc 65 (Zn 65)	10
Zinc 69m (Zn 69m)	100
Zinc 69 (Zn 69)	1,000
Zirconium 93 (Zr 93)	10
Zirconium 95 (Zr 95)	10
Zirconium	10
Any radioactive material not listed above other than alpha-emitting radioactive material	0.1

<b><u>Schedule B</u></b>	
<b><u>By-Product Material</u></b>	<b><u>Microcuries</u></b>
<u>Antimony 122 (Sb 122)</u>	<u>100</u>
<u>Antimony 124 (Sb 124)</u>	<u>10</u>
<u>Antimony 125 (Sb 125)</u>	<u>10</u>
<u>Arsenic 73 (As 73)</u>	<u>100</u>
<u>Arsenic 74 (As 74)</u>	<u>10</u>
<u>Arsenic 76 (As 76)</u>	<u>10</u>
<u>Arsenic 77 (As 77)</u>	<u>100</u>
<u>Barium 131 (Ba 131)</u>	<u>10</u>
<u>Barium 133 (Ba 133)</u>	<u>10</u>
<u>Barium 140 (Ba 140)</u>	<u>10</u>
<u>Bismuth 210 (Bi 210)</u>	<u>1</u>
<u>Bromine 82 (Br 82)</u>	<u>10</u>
<u>Cadmium 109 (Cd 109)</u>	<u>10</u>
<u>Cadmium 115m (Cd 115m)</u>	<u>10</u>
<u>Cadmium 115 (Cd 115)</u>	<u>100</u>
<u>Calcium 45 (Ca 45)</u>	<u>10</u>
<u>Calcium 47 (Ca 47)</u>	<u>10</u>
<u>Carbon 14 (C 14)</u>	<u>100</u>
<u>Cerium 141 (Ce 141)</u>	<u>100</u>
<u>Cerium 143 (Ce 143)</u>	<u>100</u>
<u>Cerium 144 (Ce 144)</u>	<u>1</u>
<u>Cesium 131 (Cs 131)</u>	<u>1,000</u>
<u>Cesium 134m (Cs 134m)</u>	<u>100</u>
<u>Cesium 134 (Cs 134)</u>	<u>1</u>
<u>Cesium 135 (Cs 135)</u>	<u>10</u>
<u>Cesium 136 (Cs 136)</u>	<u>10</u>
<u>Cesium 137 (Cs 137)</u>	<u>10</u>
<u>Chlorine 36 (Cl 36)</u>	<u>10</u>
<u>Chlorine 38 (Cl 38)</u>	<u>10</u>

<b><u>Schedule B</u></b>	
<b><u>By-Product Material</u></b>	<b><u>Microcuries</u></b>
<u>Chromium 51 (Cr 51)</u>	<u>1,000</u>
<u>Cobalt 58m (Co 58m)</u>	<u>10</u>
<u>Cobalt 58 (Co 58)</u>	<u>10</u>
<u>Cobalt 60 (Co 60)</u>	<u>1</u>
<u>Copper 64 (Cu 64)</u>	<u>100</u>
<u>Dysprosium 165 (Dy 165)</u>	<u>10</u>
<u>Dysprosium 166 (Dy 166)</u>	<u>100</u>
<u>Erbium 169 (Er 169)</u>	<u>100</u>
<u>Erbium 171 (Er 171)</u>	<u>100</u>
<u>Europium 152 9.2 h (Eu 152 9.2 h)</u>	<u>100</u>
<u>Europium 152 13 yr (Eu 152 13 yr)</u>	<u>1</u>
<u>Europium 154 (Eu 154)</u>	<u>1</u>
<u>Europium 155 (Eu 155)</u>	<u>10</u>
<u>Fluorine 18 (F 18)</u>	<u>1,000</u>
<u>Gadolinium 153 (Gd 153)</u>	<u>10</u>
<u>Gadolinium 159 (Gd 159)</u>	<u>100</u>
<u>Gallium 72 (Ga 72)</u>	<u>10</u>
<u>Germanium 71 (Ga 71)</u>	<u>100</u>
<u>Gold 198 (Au 198)</u>	<u>100</u>
<u>Gold 199 (Au 199)</u>	<u>100</u>
<u>Hafnium 181 (Hf 181)</u>	<u>10</u>
<u>Holmium 166 (Ho 166)</u>	<u>100</u>
<u>Hydrogen 3 (H3)</u>	<u>1,000</u>
<u>Indium 113m (In 113m)</u>	<u>100</u>
<u>Indium 114m (In 114m)</u>	<u>10</u>
<u>Indium 115m (In 115m)</u>	<u>100</u>
<u>Indium 115 (In 115)</u>	<u>10</u>
<u>Iodine 125 (I 125)</u>	<u>1</u>
<u>Iodine 126 (I 126)</u>	<u>1</u>
<u>Iodine 129 (I 129)</u>	<u>0,1</u>
<u>Iodine 131 (I 131)</u>	<u>1</u>

<b><u>Schedule B</u></b>	
<b><u>By-Product Material</u></b>	<b><u>Microcuries</u></b>
<u>Iodine 132 (I 132)</u>	<u>10</u>
<u>Iodine 133 (I 133)</u>	<u>1</u>
<u>Iodine 134 (I 134)</u>	<u>10</u>
<u>Iodine 135 (I 135)</u>	<u>10</u>
<u>Iridium 192 (Ir 192)</u>	<u>10</u>
<u>Iridium 194 (Ir 194)</u>	<u>100</u>
<u>Iron 55 (Fe 55)</u>	<u>100</u>
<u>Iron 59 (Fe 59)</u>	<u>10</u>
<u>Krypton 85 (Kr 85)</u>	<u>100</u>
<u>Krypton 87 (Kr 87)</u>	<u>10</u>
<u>Lanthanum 140 (La 140)</u>	<u>10</u>
<u>Lutetium 177 (Lu 177)</u>	<u>100</u>
<u>Manganese 52 (Mn 52)</u>	<u>10</u>
<u>Manganese 54 (Mn 54)</u>	<u>10</u>
<u>Manganese 56 (Mn 56)</u>	<u>10</u>
<u>Mercury 197m (Hg 197m)</u>	<u>100</u>
<u>Mercury 197 (Hg 197)</u>	<u>100</u>
<u>Mercury 203 (Hg 203)</u>	<u>10</u>
<u>Molybdenum 99 (Mo 99)</u>	<u>100</u>
<u>Neodymium 147 (Nd 147)</u>	<u>100</u>
<u>Neodymium 149 (Nd 149)</u>	<u>100</u>
<u>Nickel 59 (Ni 59)</u>	<u>100</u>
<u>Nickel 63 (Ni 63)</u>	<u>10</u>
<u>Nickel 65 (Ni 65)</u>	<u>100</u>
<u>Niobium 93m (Nb 93m)</u>	<u>10</u>
<u>Niobium 95 (Nb 95)</u>	<u>10</u>
<u>Niobium 97 (Nb 97)</u>	<u>10</u>
<u>Osmium 185 (Os 185)</u>	<u>10</u>
<u>Osmium 191m (Os 191)</u>	<u>100</u>
<u>Osmium 191 (Os 191)</u>	<u>100</u>
<u>Osmium 193 (Os 193)</u>	<u>100</u>

<b><u>Schedule B</u></b>	
<b><u>By-Product Material</u></b>	<b><u>Microcuries</u></b>
<u>Palladium 103 (Pd 103)</u>	<u>100</u>
<u>Palladium 109 (Pd 109)</u>	<u>100</u>
<u>Phosphorus 32 (P 32)</u>	<u>10</u>
<u>Platinum 191 (Pt 191)</u>	<u>100</u>
<u>Platinum 193m (Pt 193m)</u>	<u>100</u>
<u>Platinum 193 (Pt 193)</u>	<u>100</u>
<u>Platinum 197m (Pt 197m)</u>	<u>100</u>
<u>Platinum 197 (Pt 197)</u>	<u>100</u>
<u>Polonium 210 (Po 210)</u>	<u>0.1</u>
<u>Potassium 42 (K 42)</u>	<u>10</u>
<u>Praseodymium 142 (Pr 142)</u>	<u>100</u>
<u>Praseodymium 143 (Pr 143)</u>	<u>100</u>
<u>Promethium 147 (Pm 147)</u>	<u>10</u>
<u>Promethium 149 (Pm 149)</u>	<u>10</u>
<u>Rhenium 186 (Re 186)</u>	<u>100</u>
<u>Rhenium 188 (Re 188)</u>	<u>100</u>
<u>Rhodium 103m (Rh 103m)</u>	<u>100</u>
<u>Rhodium 105 (Rh 105)</u>	<u>100</u>
<u>Rubidium 86 (Rb86)</u>	<u>10</u>
<u>Rubidium 87 (Rb87)</u>	<u>10</u>
<u>Ruthenium 97 (Ru 97)</u>	<u>100</u>
<u>Ruthenium 103 (Ru 103)</u>	<u>10</u>
<u>Ruthenium 105 (Ru 105)</u>	<u>10</u>
<u>Ruthenium 106 (Ru 106)</u>	<u>1</u>
<u>Samarium 151 (Sm 151)</u>	<u>10</u>
<u>Samarium 153 (Sm 153)</u>	<u>100</u>
<u>Scandium 46 (Sc 46)</u>	<u>10</u>
<u>Scandium 47 (Sc 47)</u>	<u>100</u>
<u>Scandium 48 (Sc 48)</u>	<u>10</u>
<u>Selenium 75 (Se 75)</u>	<u>10</u>
<u>Silicon 31 (Si 31)</u>	<u>100</u>

<b><u>Schedule B</u></b>	
<b><u>By-Product Material</u></b>	<b><u>Microcuries</u></b>
<u>Silver 105 (Ag 105)</u>	<u>10</u>
<u>Silver 110m (Ag 110m)</u>	<u>1</u>
<u>Silver 111 (Ag 111)</u>	<u>100</u>
<u>Sodium 24 (Na 24)</u>	<u>10</u>
<u>Strontium 85 (Sr 85)</u>	<u>10</u>
<u>Strontium 89 (Sr 89)</u>	<u>1</u>
<u>Strontium 90 (Sr 90)</u>	<u>0.1</u>
<u>Strontium 91 (Sr 91)</u>	<u>10</u>
<u>Strontium 92 (Sr 92)</u>	<u>10</u>
<u>Sulphur 35 (S 35)</u>	<u>100</u>
<u>Tantalum 182 (Ta 182)</u>	<u>10</u>
<u>Technetium 96 (Tc 96)</u>	<u>10</u>
<u>Technetium 97m (Tc 97m)</u>	<u>100</u>
<u>Technetium 97 (Tc 97)</u>	<u>100</u>
<u>Technetium 99m (Tc 99m)</u>	<u>100</u>
<u>Technetium 99 (Tc 99)</u>	<u>10</u>
<u>Tellurium 125 m (Te 125 m)</u>	<u>10</u>
<u>Tellurium 127m (Te 127m)</u>	<u>10</u>
<u>Tellurium 127 (Te 127)</u>	<u>100</u>
<u>Tellurium 129m (Te 129m)</u>	<u>10</u>
<u>Tellurium 129 (Te 129)</u>	<u>100</u>
<u>Tellurium 131m (Te 131m)</u>	<u>10</u>
<u>Tellurium 132 (Te 132)</u>	<u>10</u>
<u>Terbium 160 (Tb 160)</u>	<u>10</u>
<u>Thallium 200 (Tl 200)</u>	<u>100</u>
<u>Thallium 201 (Tl 201)</u>	<u>100</u>
<u>Thallium 202 (Tl 202)</u>	<u>100</u>
<u>Thallium 204 (Tl 204)</u>	<u>10</u>
<u>Thulium 170 (Tm 170)</u>	<u>10</u>
<u>Thulium 171 (Tm 171)</u>	<u>10</u>
<u>Tin 113 (Sn 113)</u>	<u>10</u>

<b>Schedule B</b>	
<b><u>By-Product Material</u></b>	<b><u>Microcuries</u></b>
<u>Tin 125 (Sn 125)</u>	<u>10</u>
<u>Tungsten 181 (W 181)</u>	<u>10</u>
<u>Tungsten 185 (W 185)</u>	<u>10</u>
<u>Tungsten 187 (W 187)</u>	<u>100</u>
<u>Vanadium 48 (V 48)</u>	<u>10</u>
<u>Xenon 131m (Xe 131m)</u>	<u>1,000</u>
<u>Xenon 133 (Xe 133)</u>	<u>100</u>
<u>Xenon 135 (Xe 135)</u>	<u>100</u>
<u>Ytterbium 175 (Yb 175)</u>	<u>100</u>
<u>Yttrium 90 (Y 90)</u>	<u>10</u>
<u>Yttrium 91 (Y91)</u>	<u>10</u>
<u>Yttrium 92 (Y92)</u>	<u>100</u>
<u>Yttrium 93 (Y93)</u>	<u>100</u>
<u>Zinc 65 (Zn 65)</u>	<u>10</u>
<u>Zinc 69m (Zn 69m)</u>	<u>100</u>
<u>Zinc 69 (Zn 69)</u>	<u>1,000</u>
<u>Zirconium 93 (Zr 93)</u>	<u>10</u>
<u>Zirconium 95 (Zr 95)</u>	<u>10</u>
<u>Zirconium 97 (Zr 97)</u>	<u>10</u>
<u>Any by-product material not listed above other than alpha-emitting by-product materials</u>	<u>0.1</u>

Note 1. ~~Where there is involved a combination of isotopes, the limit for the combination should be derived as follows: Determine the amount each isotope possessed and 1,000 times the amount in Appendix B for each of those isotopes when not in combination. The sum of the ratios of those quantities may not exceed 1.~~

Example:

~~Delete this formula~~

$$\frac{\text{Amt. of Isotope A possessed}}{1000 \times \text{Appendix B quantity for Isotope A}} + \frac{\text{Amt. of Isotope B possessed}}{1000 \times \text{Appendix B quantity for Isotope B}} = 1$$

~~Note 2. To convert microcuries ( $\mu\text{Ci}$ ) to SI units kilobecquerels (kBq), multiply the above values by 37.~~

~~Example:~~

~~Zirconium 97 (10  $\mu\text{Ci}$  multiplied by 37 is equivalent to 370 kBq).~~

<b>Appendix C</b> <b>Financial Assurance Arrangements</b> <b>Recommended Amounts for Mitigation, Liability, and Decommissioning</b>			
<b>By Title</b>	<b>Clean up</b>	<b>Third Party and/or Off-Site Damages</b>	<b>Decommissioning</b>
<b>A. Licensees</b> 1. Manufacturing & 2. Radiography 3. Gauges 4. Well Logging 5. Nuclear Medicine 6. Rad. Therp. 7. Acad. 8. R & D 9. Instru. Calib. 10. Irradiators 11. Ind. other than gauges 12. Consultants 13. General Lic. 14. Others not listed in category A	As determined by the chosen method	As determined by the chosen method	For Category A as a whole by <u>quantity of material (Q):</u> 1. $Q > 10^{10}$ x <del>Appendix</del> <u>Schedule B, Chapter 4 3</u> , as sealed sources = \$75,000. 2. $10^3$ — $10^4$ x <del>Appendix B,</del> <del>Chapter 4, unsealed</del> <del>sources</del> ( $10^4$ x <u>Schedule B,</u> <u>Chapter 3, unsealed sources</u> ) $Q > (10^3$ x <u>Schedule B,</u> <u>Chapter 3, unsealed sources</u> ), or 10-100 mCi source materials, dispersible form = \$150,000. 3. $10^4$ —( $10^5$ x <del>Appendix</del> <u>Schedule B, Chapter 4 3,</u> <u>unsealed sources</u> ) $Q > (10^4$ x <u>Schedule B, Chapter 3,</u> <u>unsealed sources)</u> = \$750,000.
<b>B. Low Quantity</b> 1. In Vitro 2. Gas Chromatograph 3. Greater than or Equal to 100 x to 1000 x Exempt Quantity 4. Unsealed, discrete alpha emitters, 10 $\mu$ Ci total 5. Check sources of sufficient quantity to require leak testing	As determined by the chosen method	As determined by the chosen method	NA for this category.

**Title 33**  
**ENVIRONMENTAL QUALITY**  
**Part XV. Radiation Protection**

**Chapter 4. Standards for Protection Against Radiation**

**Subchapter G. Precautionary Procedures**

**§453. Labeling Containers and Radiation Machines**

A. The licensee or registrant shall ensure that each container of licensed or registered source of radiation bears a durable, clearly visible label bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL, NOTIFY CIVIL AUTHORITIES [or 'NAME OF COMPANY']" or "DANGER, RADIOACTIVE MATERIAL, NOTIFY CIVIL AUTHORITIES [or 'NAME OF COMPANY']." The label shall also provide information such as the radionuclides present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels, kinds of materials, and mass enrichment, to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures.

\* \* \*

[See Prior Text in B-C]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 19:1421 (November 1993), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*

**Subchapter J. Reports**

**§487. Reports of Exposures, Radiation Levels, and Concentrations of Radioactive Material Exceeding the Constraints or Limits**

\* \* \*

[See Prior Text in A-B.1.b]

- c. the cause of the elevated exposures, dose rates, or concentrations; ~~and~~
- d. corrective steps taken or planned to ensure against a recurrence, including the schedule for achieving conformance with applicable limits, ALARA constraints, generally applicable environmental standards, and associated license or registration conditions; and
- e. information required by LAC 33:XV.547.E if the overexposure involves failure of safety components of radiography equipment.

\* \* \*

[See Prior Text in B.2-C]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 19:1421 (November 1993), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2579 (November 2000), LR 26:2771 (December 2000), LR 27:\*\*

**Title 33**  
**ENVIRONMENTAL QUALITY**  
**Part XV. Radiation Protection**

**Chapter 5. Radiation Safety Requirements for Industrial Radiographic Operations**

**§503. Definitions**

As used in this Chapter, the following definitions apply:

*Annual Refresher Safety Training*—a review conducted or provided by the licensee for its employees on radiation safety aspects of industrial radiography. The review may include, as appropriate, the results of internal inspections, new procedures or equipment, new or revised regulations, and accidents or errors that have been observed, and should also provide opportunities for employees to ask safety questions.

*Associated Equipment*—equipment that is used in conjunction with a radiographic exposure device to make radiographic exposures, that drives, guides, or comes in contact with the source (e.g., guide tube, control tube, control (drive) cable, removable source stop, "J" tube, and collimator when it is used as an exposure head).

\* \* \*

[See Prior Text]

*Certifying Entity*—an independent certifying organization meeting the requirements in 10 CFR 34, appendix A, or an agreement state meeting the requirements in 10 CFR 34, appendix A, parts II and III.

\* \* \*

[See Prior Text]

*Control (Drive) Cable*—the cable that is connected to the source assembly and used to drive the source to and from the exposure location.

*Control Drive Mechanism*—a device that enables the source assembly to be moved to and from the exposure device.

*Control Tube*—a protective sheath for guiding the control cable. The control tube connects the control drive mechanism to the radiographic exposure device.

\* \* \*

[See Prior Text]

*Exposure Head*—a device that locates the gamma radiography sealed source in the selected working position. (An exposure head is also known as a source stop.)

*Field Station*—a facility where licensed material may be stored or used and from which equipment is dispatched.

*Guide Tube (Projection Sheath)*—a flexible or rigid tube (i.e., "J" tube) for guiding the source assembly and the attached control cable from the exposure device to the exposure head. The guide tube may also include the connections necessary for attachment to the exposure device and to the exposure head.

*Hands-On Experience*—experience in all of those areas considered to be directly involved in the radiography process.

*Independent Certifying Organization*—an independent organization that meets all of the criteria of Appendix A of this Chapter.

\* \* \*

[See Prior Text]

*Lay-Barge Radiography*—industrial radiography performed on any water vessel used for laying pipe.

\* \* \*

[See Prior Text]

*Offshore Platform Radiography*—industrial radiography conducted from a platform over a body of water.

\* \* \*

[See Prior Text]

*Practical Examination*—a demonstration through practical application of the safety rules and principles in industrial radiography, including use of all appropriate equipment and procedures.

*Radiation Safety Officer for Industrial Radiography*—an individual with the responsibility for the overall radiation safety program on behalf of the licensee and who meets the requirements of LAC 33:XV.573.E.

\* \* \*

[See Prior Text]

*Radiographic Exposure Device*—an x-ray tube or any instrument containing a sealed source fastened or contained therein, in which the sealed source or shielding thereof may be moved, or otherwise changed, from a shielded to unshielded position for purposes of making a radiographic exposure.

*Radiographic Operations*—all activities associated with the presence of radioactive sources in a radiographic exposure device during use of the device or transport (except when being transported by a common or contract transport), to include surveys to confirm the adequacy of boundaries, setting up equipment, and any activity inside restricted area boundaries.

\* \* \*

[See Prior Text]

*S-Tube*—a tube through which the radioactive source travels when inside a radiographic exposure device.

\* \* \*

[See Prior Text]

*Source Assembly*—an assembly that consists of the sealed source and a connector that attaches the source to the control cable. The source assembly may also include a stop ball used to secure the source in the shielded position.

\* \* \*

[See Prior Text]

*Underwater Radiography*—industrial radiography performed when the radiographic exposure device and/or related equipment are beneath the surface of the water.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), LR 23:1138 (September 1997), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2581 (November 2000), LR 26:2772 (December 2000), LR 27:\*\*

## **§505. ~~Reserved~~ Form of Records**

A. Each record required by this Chapter must be legible throughout the specified retention period. The record may be the original or a reproduced copy or a microform provided that the copy or microform is authenticated by authorized personnel and that the microform is capable of reproducing a clear copy throughout the required retention period. The record may also be stored in electronic media

with the capability for producing legible, accurate, and complete records during the required retention period. Records, such as letters, drawings, and specifications, must include all pertinent information, such as stamps, initials, and signatures. The licensee or registrant shall maintain adequate safeguards against tampering with and loss of records.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2101 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*

## **§506-539. Reserved**

### **Subchapter A. Equipment Control**

#### **§540. Limits on Levels of Radiation for Radiographic ~~Exposure Devices~~ Source Changers and Storage Containers**

A. Radiographic exposure devices measuring less than 4 inches (10 centimeters) from the sealed source storage position to any exterior surface of the device shall have no radiation level in excess of 50 milliroentgens ( $1.29 \times 10^{-5}$  C/kg) per hour at 6 inches (15 centimeters) from any exterior surface of the device. Radiographic exposure devices measuring a minimum of 4 inches (10 centimeters) from the sealed source storage position to any exterior surface of the device and all storage containers for sealed sources or outer containers for radiographic exposure devices shall have no radiation level in excess of 200 milliroentgens ( $5.16 \times 10^{-5}$  C/kg) per hour at any exterior surface and 10 milliroentgens ( $2.58 \times 10^{-6}$  C/kg) per hour at 1 meter from any exterior surface. The radiation levels specified are with the sealed source in the shielded position. The maximum exposure rate limits for storage containers and source changers are 2 millisieverts (200 millirem) per hour at any exterior surface and 0.1 millisieverts (10 millirem) per hour at 1 meter from any exterior surface with the sealed source in the shielded position.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*

#### **§541. Locking of Sources of Radiation**

A. The maximum exposure rate limits for storage containers and source changers are 2 millisieverts (200 millirem) per hour at any exterior surface and 0.1 millisieverts (10 millirem) per hour at 1 meter from any exterior surface with the sealed source in the shielded position. Each source of radiation shall be provided with a lock or lockable outer container designed to prevent unauthorized or accidental production of radiation or removal or exposure of a sealed source and shall be kept locked at all times except when under the direct surveillance of a radiographer or instructor or as may be otherwise authorized pursuant to LAC 33:XV.585. Each storage container likewise shall be provided with a lock and shall be kept locked when containing sealed sources except when the container is under the direct surveillance of a radiographer or instructor.

~~B. Radiographic exposure devices and storage containers, prior to being moved from one location to another and also prior to being secured at a given location, shall be locked and surveyed on all sides with an appropriate survey instrument to assure that the sealed source is in the shielded position.~~

~~C. During radiographic operations the sealed source shall be secured in its shielded position by manually locking the radiographic exposure device or source changer each time the sealed source is returned to its shielded position if no automatic source securing mechanism is incorporated in the design of the exposure device or source changer. A survey shall be performed to determine that the sealed source is in the shielded position pursuant to LAC 33:XV.587.B.~~

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*

#### **§542. Storage and Transportation Precautions**

A. Locked radiographic exposure devices, source changers, storage containers, and radiation machines shall be physically secured to prevent tampering or removal by unauthorized personnel. The licensee shall store radioactive material in a manner that will minimize danger from explosion or fire.

B. The licensee may not use a source changer or a container to store radioactive material unless the source changer or container has securely attached to it a durable, legible, and clearly visible label as specified in LAC 33:XV.453. Radiographic exposure devices, source changers, or transport containers that contain radioactive material shall not be stored in residential locations. This requirement does not apply to storage of radioactive material in a vehicle in transit for use at temporary job sites, if the licensee complies with LAC 33:XV.542.Subsection C of this Section, and if the vehicle does not constitute a permanent storage location as described in LAC 33:XV.542.Subsection D of this Section.

C. If a vehicle is to be used for storage of radioactive material, a vehicle survey shall be performed after securing radioactive material in the vehicle and before transport to ensure that radiation levels do not exceed the limits specified in LAC 33:XV.421.A at the exterior surface of the vehicle.

1. The licensee shall lock and physically secure the transport package containing licensed material in the transporting vehicle to prevent accidental loss, tampering, or unauthorized removal of the licensed material from the vehicle.

2. The licensee may not transport licensed material unless the material is packaged and the package is labeled, marked, and accompanied by appropriate shipping papers in accordance with LAC 33:XV.Chapter 15.

\* \* \*

[See Prior Text in D-D.3]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*

#### **§543. Radiation Survey Instruments**

A. The licensee or registrant shall maintain sufficient calibrated and operable radiation survey instruments at each location where radioactive material is present to make physical radiation surveys as required by this Chapter and LAC 33:XV.430. Instrumentation required by this Section shall have a

range such that ~~2 milliroentgens ( $5.16 \times 10^{-7}$  C/kg)~~ 0.02 millisieverts (2 millirems) per hour through ~~1 roentgen ( $2.58 \times 10^{-4}$  C/kg)~~ 0.01 sievert (1 rem) per hour can be measured.

\* \* \*

[See Prior Text in B-B.2]

3. at two points located approximately 1/3 and 2/3 of full-scale on each scale for linear scale instruments; at midrange of each decade, and at two points of at least one decade for logarithmic scale instruments; and ~~according to the manufacturers procedures~~ at three points between 0.02 and 10 millisieverts (2 and 1000 millirems) per hour for digital instruments.

C. Records of these calibrations shall be maintained for ~~two~~ three years after the calibration date for inspection by the department.

D. Each radiation survey instrument shall be checked with a radiation source at the beginning of each day of use and at the beginning of each work shift to ensure it is operating properly. Records of the checks shall be maintained for ~~two~~ three years. If equipment problems are found, the equipment must be removed from service until repaired.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), LR 23:1138 (September 1997), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2581 (November 2000), LR 27:\*\*

#### **§544. Leak Testing, Repair, Tagging, Opening, Modification, and Replacement, and Records of Receipt and Transfer of Sealed Sources**

\* \* \*

[See Prior Text in A-B]

C. The leak test shall be capable of detecting the presence of 0.005 microcurie (185 Bq) of removable contamination on the sealed source. An acceptable leak test for sealed sources in the possession of a radiography licensee would be to test at the nearest accessible point to the sealed source storage position, or other appropriate measuring point, by a procedure which has been approved ~~pursuant to~~ in accordance with LAC 33:XV.326.E.1.e. Records of leak test results shall be kept in units of microcuries (becquerels) and maintained for inspection by the department for ~~two~~ three years.

\* \* \*

[See Prior Text in D-E]

F. Each exposure device using depleted uranium (DU) shielding and an "S" tube configuration must be tested for DU contamination at intervals not to exceed 12 months. The analysis must be capable of detecting the presence of 0.005 microcuries (185 Bq) of radioactive material on the test sample and must be performed by a person specifically authorized by the administrative authority, U.S. Nuclear Regulatory Commission, or any other agreement state to perform the analysis. Should such testing reveal the presence of 0.005 microcuries (185 Bq) or more of removable DU contamination, the exposure device must be removed from use until an evaluation of the wear on the S-tube has been made. Should the evaluation reveal that the S-tube is worn through, the device may not be used again. DU shielded devices do not have to be tested for DU contamination while in storage and not in use. Before using or transferring such a device, however, the device must be tested for DU contamination if the interval of storage exceeded 12 months. A record of the DU leak test must be made in accordance with Subsection C of this Section.

G. Each licensee or registrant shall maintain records showing the receipts and transfers of sealed sources and devices using DU for shielding and retain each record for inspection by the department for three years. These records must include the date, the name of the individual making the

record, radionuclide, number of becquerels (curies) or mass (for DU), and manufacturer, model, and serial number of each source of radiation and/or device, as appropriate.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2582 (November 2000), LR 27:\*\*

#### **§545. Quarterly Inventory**

A. Each licensee shall conduct a quarterly physical inventory to account for all sealed sources and licensed devices received or possessed under his or her license, including devices containing depleted uranium. The records of the inventories shall be maintained for inspection by the department for at least ~~two~~three consecutive years from the date of the inventory and shall include the quantities and kinds of radioactive material, the location of sealed sources and/or devices, the date of the inventory, the name of individual(s) performing the inventory, the manufacturer, the model number, and the serial number.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2582 (November 2000), LR 27:\*\*

#### **§546. Utilization Logs**

A. Each licensee or registrant shall maintain current logs, which shall be kept available for inspection by the department for ~~two~~three consecutive years from the date of the recorded event, showing for each source of radiation the following information:

1. a unique identification, such as a describing the make, model, and serial number of each radiation machine, each radiographic exposure device, each transport or storage container in which the sealed source is located, and each sealed source;
2. the identity and signature of the radiographer to whom the source is assigned;

\* \* \*

[See Prior Text in A.3-4]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2582 (November 2000), LR 27:\*\*

#### **§547. Inspection and Maintenance of Radiographic Exposure Devices and Storage Containers**

A. ~~Each licensee or registrant shall ensure that checks for obvious defects in radiation machines, radiographic exposure devices, and associated equipment are performed and recorded prior to each day of use or work shift.~~ The licensee or registrant shall perform visual and operability checks on radiation machines, radiographic exposure devices, transport and storage containers, source changers, and associated equipment prior to each day's use, or work shift, to ensure that:

1. the equipment is in good condition;
2. the sources are adequately shielded; and
3. required labeling is present.

B. Each licensee or registrant shall ~~conduct a program of~~ have written procedures for and perform at least quarterly inspections at intervals not to exceed three months, or before first use

thereafter, and routine maintenance of radiation machines, radiographic exposure devices, source changers, storage containers, and associated equipment to ensure proper functioning of components important to safety. All appropriate parts shall be maintained in accordance with manufacturer's specifications. The licensee's inspection and maintenance program must include procedures to ensure that Type B packages are shipped and maintained in accordance with the certificate of compliance or other approval. Records of inspection and maintenance shall be maintained for inspection by the department for two consecutive years from the date of the recorded event.

C. Records of inspection and maintenance conducted in accordance with Subsections A and B of this Section shall be maintained for inspection by the department for three consecutive years from the date of the recorded event. The record of inspection must include the date of check or inspection, name of inspector, equipment involved, any problems found, and what repair and/or maintenance, if any, was done. If any inspection conducted pursuant to in accordance with LAC 33:XV.547.Subsections A or and B of this Section reveals damage to components critical to radiation safety, the device shall be removed from service and labeled as defective until repairs have been made.

\* \* \*

[See Prior Text in D-D.3]

E. The licensee or registrant shall include the following information in each report required by Subsection LAC 33:XV.547.D of this Section and in each report of overexposure submitted under LAC 33:XV.487 that involves failure of safety components of radiography equipment:

\* \* \*

[See Prior Text in E.1-7]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2582 (November 2000), LR 27:\*\*

#### **§548. Permanent Radiographic Installations**

\* \* \*

[See Prior Text in A-A.1]

2. the control device or alarm system as described in LAC 33:XV.436.A and B shall be tested for proper operation at the beginning of each day of equipment use. If a control device or alarm system is operating improperly, it shall be immediately labeled as defective and repaired before industrial radiographic operations are resumed. Records of these tests shall be maintained for inspection by the department for ~~two~~three consecutive years from the date of the event or until disposition is authorized.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2582 (November 2000), LR 27:\*\*

### **Subchapter B. Personal Radiation Safety Requirements for Radiographers**

#### **§573. Conducting Industrial Radiographic Operations**

A. Whenever radiography is performed at a location other than a permanent radiographic installation, the radiographer must be accompanied by at least one other qualified radiographer or an individual who has, at a minimum, met the requirements of Subsection E of this Section. The additional qualified individual shall observe the operations and be capable of providing immediate assistance to prevent unauthorized entry. Radiography may not be performed if only one qualified individual is present.

B. All radiographic operations conducted at locations of use authorized on the license must be conducted in a permanent radiographic installation, unless specifically authorized by the department.

C. A licensee may conduct lay-barge, offshore platform, or underwater radiography only if procedures have been approved by the department, the Nuclear Regulatory Commission, or another agreement state.

D. At temporary job sites each licensee or registrant shall provide, as a minimum, two-person crews. Such crews shall consist of at least two qualified radiographers, an approved instructor directly supervising a qualified radiographer trainee, or an approved instructor supervising a radiographer assistant.

E. A radiation safety officer (RSO) shall be designated for every industrial radiography license and certificate of registration, or license condition specifying such, issued by the department. The RSO's qualifications shall include:

1. possession of a high school diploma or certificate of high school equivalency based on the GED test;
2. completion of the training and testing requirements of LAC 33:XV.575; and
3. two years of documented radiation protection experience, including knowledge of industrial radiographic operations, with at least 40 hours of active participation in industrial radiographic operations.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*:

### **§575. Training and Testing**

\* \* \*

[See Prior Text in A-A.6]

B. Each licensee or registrant shall maintain, for inspection by the department, until disposition is authorized by the department, the following records for each radiographer and radiographer trainee:

1. records of the above-training and certification. The records must include radiographer certification documents and verification of certification status, including copies of written tests, and dates and results of oral tests and field examinations, and the names of individuals conducting and receiving the oral and field examinations; and
2. records of annual refresher safety training and semiannual inspections of job performance. The records must list the topics discussed during the refresher safety training, the dates the annual refresher safety training was conducted, and names of the instructors and attendees. For inspections of job performance, the records must also include a list showing the items checked and any noncompliance observed by the radiation safety officer or designee.

\* \* \*

[See Prior Text in C]

~~D. At temporary job sites each licensee or registrant shall provide, as a minimum, two person crews. Such crews shall consist of at least two qualified radiographers, an approved instructor directly supervising a qualified radiographer trainee, or an approved instructor supervising a radiographer assistant.~~

~~E. A radiation safety officer (RSO) shall be designated for every industrial radiography license and certificate of registration, or license condition specifying such, issued by the department. The RSO's qualifications shall include:~~

- ~~1. possession of a high school diploma or certificate of high school equivalency based on the GED test;~~
- ~~2. completion of the training and testing requirements of this Section; and~~
- ~~3. two years of documented radiation protection experience, including knowledge of industrial radiographic operations, with at least 40 hours of active participation in industrial radiographic operations.~~

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), LR 20:999 (September 1994), LR 23:1138 (September 1997), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2583 (November 2000), LR 27:\*\*

### **§576. Operating and Emergency Procedures**

A. The licensee's or registrant's operating and emergency procedures shall include instructions in at least the following:

\* \* \*

[See Prior Text in A.1-4]

5. personnel monitoring and the use of personnel monitoring equipment, including steps that must be taken immediately by radiography personnel in the event a pocket dosimeter is found to be off scale or an alarm ratemeter sounds unexpectedly;

\* \* \*

[See Prior Text in A.6-8]

9. maintenance of records; ~~and~~

10. the daily inspection, ~~and maintenance, and operability checks~~ of radiographic exposure devices, radiation machines, associated equipment, survey meters, and personnel monitoring devices; and

11. source recovery procedure if licensee will perform source recoveries.

B. Each licensee shall maintain a copy of current operating and emergency procedures until the department terminates the license. Superseded material must be retained for three years after the change is made.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*

### §577. Personnel Monitoring Control

A. No licensee or registrant shall permit an individual to act as a radiographer, instructor, or radiographer trainee unless, at all times during radiographic operations, each such individual wears a direct-reading pocket dosimeter, an alarm ratemeter, and either a film badge, an optically-stimulated luminescence dosimeter (OSL), or a thermoluminescent dosimeter (TLD), except that for permanent radiography facilities where other appropriate alarming or warning devices are in routine use, the wearing of an alarming ratemeter is not required.

B. Pocket dosimeters shall have a range of zero to at least ~~200 milliroentgens ( $5.16 \times 10^{-5}$  C/kg)~~ 2 millisieverts (200 millirems) and shall be recharged at least daily or at the start of each shift. Electronic personal dosimeters may only be used in place of ion-chamber pocket dosimeters. Pocket dosimeters, or electronic personal dosimeters, shall be checked for correct response to radiation at periods not to exceed one year. Acceptable dosimeters shall read within  ~~$\pm 30$~~   $\pm 20$  percent of the true radiation exposure. Records of positive dosimeter response shall be maintained for ~~two~~ three years by the licensee or registrant for department inspection.

C. Each film badge, ~~or thermoluminescent dosimeter TLD~~, or OSL shall be assigned to and worn by only one individual. Film badges must be replaced at periods not to exceed one month. After replacement, each film badge, OSL, or TLD must be processed as soon as possible.

D. Direct reading dosimeters, such as electronic personal dosimeters or P-pocket dosimeters, shall be read and exposures recorded at least daily with use.

E. If an individual's pocket dosimeter is discharged beyond its range (i.e., goes "off-scale"), or an individual's electronic pocket dosimeter reads greater than 2 millisieverts (200 millirems) and the possibility of radiation exposure cannot be ruled out as the cause, industrial radiographic operations by that individual shall cease and the individual's film badge, OSL, or TLD shall be processed immediately. The individual shall not return to work with sources of radiation until a determination of the radiation exposure has been made. This determination must be made by the RSO or the RSO's designee. The results of this determination must be recorded and maintained indefinitely or until the department authorizes their disposition.

F. Records of the pocket dosimeter readings shall be maintained for inspection by the department for ~~two~~ three consecutive years. If the dosimeter readings were used to determine external radiation dose, the records shall be maintained indefinitely or until the department authorizes their disposition.

G. If a film badge, OSL, or TLD is lost or damaged, the worker shall cease work immediately until a replacement film badge, OSL, or TLD is provided and the exposure is calculated for the time period from issuance to loss or damage of the film badge, OSL, or TLD. The results of the calculated exposure and the time period for which the film badge, OSL, or TLD was lost or damaged must be recorded and maintained indefinitely or until the department authorizes their disposition.

\* \* \*

[See Prior Text in H-H.1]

2. be set to give an alarm signal at the preset dose rate of 5 mSv/hr (500 millirems/hour);
3. require special means to change the preset alarm function; and

4. be calibrated at periods not to exceed one year for correct response to radiation: acceptable ratemeters must alarm within  $\pm 20$  percent of the true radiation dose rate. Records of calibrations will be maintained for ~~two~~three years.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2583 (November 2000), LR 27:\*\*

### **Subchapter C. Precautionary Procedures in Radiographic Operations**

#### **§585. Security**

A. During each radiographic operation, a radiographer or instructor shall maintain continuous direct, visual surveillance of the operation to protect against unauthorized entry into a radiation area or high radiation area, as defined in LAC 33:XV.Chapter 1, except:

1. where the high radiation area is equipped with a control device or alarm system as described in LAC 33:XV.436.A; or
2. where the high radiation area is locked to protect against unauthorized or accidental entry.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*

#### **§587. Radiation Surveys and Survey Records**

\* \* \*

[See Prior Text in A]

B. A physical radiation survey shall be made after each radiographic exposure utilizing radiation machines or sealed sources to determine that the machine is "off" or that the sealed source has been returned to its shielded position before exchanging films, repositioning the exposure head, or dismantling equipment. The entire circumference or perimeter of the radiographic exposure device shall be surveyed. If the radiographic exposure device has a source guide tube, the survey shall also include the entire length of the guide tube.

C. A physical radiation survey shall be made to determine that each sealed source is in its shielded position any time the source is exchanged and prior to securing the radiographic exposure device or storage container as specified in LAC 33:XV.541.

\* \* \*

[See Prior Text in D]

E. Records shall be kept of the surveys required by ~~LAC 33:XV.587.~~Subsections C and D of this Section. Such records shall be maintained for inspection by the department for ~~two~~three consecutive years after completion of the survey. If the survey has been used to determine an individual's exposure, the records of the survey shall be maintained until the department authorizes their disposition.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation

Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2584 (November 2000), LR 27:\*\*

**§588. Documents and Records Required at Temporary Job Sites and Applicable Field Stations**

A. Each licensee or registrant conducting industrial radiography at a temporary job site or applicable field station shall have the following documents and records available at that job site or field station for inspection by the department:

\* \* \*

[See Prior Text in A.1-4]

5. ~~daily pocket~~ dosimeter records, from daily pocket dosimeters and/or electronic personal dosimeters, for the period of operation at the site as required by LAC 33:XV.577;

6. the latest instrument calibration and leak test records for specific devices and sealed sources in use at the site as required by LAC 33:XV.543 and 544. Acceptable records include tags or labels ~~which~~ that are affixed to the device or survey meter; ~~and~~

7. a copy of the written confirmation letter issued by the department granting radiographer trainee status to any radiographer trainee performing industrial radiography at the temporary job site;

8. records of equipment problems identified in daily checks of equipment as required in LAC 33:XV.547;

9. evidence of the latest calibration of alarming ratemeters and operability checks of dosimeters as required by LAC 33:XV.577;

10. the shipping papers for the transportation of radioactive materials as required by LAC 33:XV.1502; and

11. when operating under reciprocity in accordance with LAC 33:XV.390, a copy of the applicable state license or registration or Nuclear Regulatory Commission license authorizing the use of sources of radiation.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2772 (December 2000), LR 27:\*\*

**§590. Specific Requirements for Radiographic Personnel Performing Industrial Radiography**

\* \* \*

[See Prior Text in A-C]

D. No individual other than a radiographer, a radiographer assistant, or a radiographer trainee who is under the personal supervision of a radiographer instructor shall manipulate controls or operate equipment used in industrial radiographic operations. The radiographer's assistant or radiographer

trainee shall also be under the personal supervision of a radiographer when using radiographic exposure devices, associated equipment, or a sealed source or while conducting radiation surveys required by LAC 33:XV.587 to determine that the sealed source has returned to its shielded position or the radiation machine is off after an exposure. The personal supervision must include:

1. the radiographer's physical presence at the site where the sources of radiation are being used;
2. the availability of the radiographer to give immediate assistance if required; and
3. the radiographer's direct observation of the assistant's performance of the operations referred to in this Section.

\* \* \*

[See Prior Text in E-F]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 20:653 (June 1994), amended LR 23:1139 (September 1997), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2584 (November 2000), LR 27:\*\*

**APPENDIX B****RADIOGRAPHER CERTIFICATION****A. Requirements For Certification Programs. All certification programs must:**

1. require applicants for certification to:
  - a. receive training in the topics set forth in Appendix A of this Chapter or equivalent Nuclear Regulatory Commission regulations; and
  - b. satisfactorily complete a written examination covering these topics;
2. require applicants for certification to provide documentation that demonstrates that the applicant has:
  - a. received training in the topics set forth in Appendix A of this Chapter or equivalent Nuclear Regulatory Commission regulations;
  - b. satisfactorily completed a minimum period of on-the-job training as specified in LAC 33:XV.575; and
  - c. received verification by a state licensee or registrant or a Nuclear Regulatory Commission licensee that the applicant has demonstrated the capability of independently working as a radiographer;
3. include procedures to ensure that all examination questions are protected from disclosure;
4. include procedures for denying an application and revoking, suspending, and reinstating a certification;
5. provide a certification period of not less than three years nor more than five years;
6. include procedures for renewing certifications and, if the procedures allow renewal without examination, require evidence of full-time employment and annual refresher training; and
7. provide a timely response to inquiries, by telephone or letter, from members of the public about an individual's certification status.

**B. Requirements For Written Examinations. All examinations must:**

1. be designed to test an individual's knowledge and understanding of the topics listed in Appendix A of this Chapter or equivalent Nuclear Regulatory Commission requirements;
2. be written in a multiple-choice format; and

3. have test items drawn from a question bank containing psychometrically valid questions based on the material in Appendix A of this Chapter.

**Title 33**  
**ENVIRONMENTAL QUALITY**  
**Part XV. Radiation Protection**

**Chapter 6. X-rays in the Healing Arts**

**§606. Radiographic Systems Other Than Fluoroscopic, Dental Intraoral, or Computed Tomography X-Ray Systems**

\* \* \*

[See Prior Text in A-B.6.b]

i. used continuously for more than one week in the same location, e.g., a room or suite, shall meet the requirements of Subsection LAC 33:XV.606.B.2.b.i6.a of this Section; and

\* \* \*

[See Prior Text in B.6.b.ii]

7. Operator Protection for Veterinary Systems and Panoramic Dental Systems. All stationary, mobile, or portable X-ray systems used for veterinary work or panoramic dental systems shall be provided with either a 6.5 foot (2 meters) high protective barrier for operator protection during exposures, or shall be provided with means to allow the operator to be at least 12 feet (3.7 meters) from the tube housing assembly during exposures.

\* \* \*

[See Prior Text in C-I]

**AUTHORITY NOTE:** Promulgated in accordance with R.S. 30:2001 et seq.

**HISTORICAL NOTE:** Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 19:1421 (November 1993), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2586 (November 2000), LR 27:\*\*

**Title 33**  
**ENVIRONMENTAL QUALITY**  
**Part XV. Radiation Protection**

**Chapter 7. Use of Radionuclides in the Healing Arts**

**§728. Decay-in-Storage**

A. A licensee shall hold radioactive material for decay-in-storage before disposal in ordinary trash and is exempt from the requirements of LAC 33:XV.~~431~~460 of these regulations if the licensee:

\* \* \*

[See Prior Text in A.1-B]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), repealed and repromulgated by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 27:\*\*

**§731. Use of Radiopharmaceuticals, Generators, and Reagent Kits For Imaging and Localization Studies**

\* \* \*

[See Prior Text in A-F.2]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Repealed and repromulgated by the Department of Environmental Quality, Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 18:34 (January 1992), amended LR 24:2104 (November 1998), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2589 (November 2000), LR 27:\*\*

**Title 33**  
**ENVIRONMENTAL QUALITY**  
**Part XV. Radiation Protection**

**Chapter 13. Licensing Requirements for Land Disposal of Radioactive Waste**

**Subchapter E. Records, Reports, Tests, and Inspections**

**§1333. Maintenance of Records, Reports, and Transfers**

\* \* \*

[See Prior Text in A-C]

D. Notwithstanding Subsections A-C of this Section, copies of records of the location and the quantity of radioactive wastes contained in the disposal site shall be transferred upon license termination to the chief executive of the nearest municipality, the chief executive of the ~~county~~parish in which the facility is located, the ~~county~~parish zoning board or land development and planning agency, the state governor, and other state, local, and federal governmental agencies as designated by the department at the time of license termination.

\* \* \*

[See Prior Text in E-J.2]

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Air Quality and Radiation Protection, Radiation Protection Division, LR 24:2111 (November 1998), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:2598 (November 2000), LR 27:\*\*

**Title 33**  
**ENVIRONMENTAL QUALITY**  
**Part XV. Radiation Protection**

**Chapter 15. Transportation of Radioactive Material**

**§1502. Scope**

\* \* \*

[See Prior Text in A-C.4]

D. If U.S. DOT regulations are not applicable to a shipment of licensed material, the licensee shall conform to the standards and requirements of the U.S. DOT specified in Subsection A of this Section to the same extent as if the shipment or transportation were subject to U.S. DOT regulations. A request for modification, waiver, or exemption from those requirements, and any notification referred to in those requirements, must be filed with, or made to, the ~~Office of Environmental Services, Permits Division~~ U.S. DOT.

AUTHORITY NOTE: Promulgated in accordance with R.S. 30:2001 et seq.

HISTORICAL NOTE: Promulgated by the Department of Environmental Quality, Nuclear Energy Division, LR 13:569 (October 1987), amended by the Office of Environmental Assessment, Environmental Planning Division, LR 26:1265 (June 2000), LR 26:2771 (December 2000), LR 27:\*\*